

156779



Ethyl Petroleum Additives
Sauget, Illinois 62201
(618) 274-4000

May 17, 1985

Mr. Dan Hopkins
On Scene Coordinator
U.S. E.P.A.
Region Five
230 South Dearborn St.
Chicago, IL 60604

Dear Mr. Hopkins:

Enclosed is a copy of the Envirodyne report and laboratory results of 2,3,7,8-TCDD analysis performed on soil samples taken at various locations in our facility in which construction projects are planned.

The sampling locations are for those areas shown on the plot plan previously submitted to you.

Based on the laboratory results indicating no detectable 2,3,7,8-TCDD contamination in these areas, we are requesting, based on our previous discussions that the southern portion of the facility be "cleared". We are making this request as additional construction projects are being planned in the southern portion of our facility and we would like to proceed without having to sample and wait for laboratory analysis. We believe the testing completed to date demonstrates that the area south of Second Street in our facility is not an area of concern for 2,3,7,8-TCDD contamination.

We are therefore requesting that the plant be divided on an east-west line through Second Street allowing the portion of the plant south of Second Street to be freed from future sampling requirements where construction projects are planned.

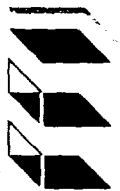
Should you have any questions concerning this request, please contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "S. McWilliams", is written over a horizontal line.

Sam McWilliams
Site Manager

SMcW:dj



ENVIRODYNE
ENGINEERS

May 15, 1985
2086-68173

Mr. Jim Sparks
Ethyl Corporation
Edwin Cooper Plant
Monsanto Avenue
Sauget, Illinois 62201

Dear Jim:

This report has been revised to include the most recent analytical results for sample M-1 O-6". This sample, as you recall, had some slight problems with quality control/assurance results. The sample was rerun with negative results, and acceptable quality control results. All applicable analytical data, chromatograms, and documentation for these samples appears in Appendix B and should be acceptable for certification by the EPA.

As always, should you have any questions regarding this report or the data, please do not hesitate to call me.

Sincerely,

Dale T. Cira
Environmental Scientist

DTC/lav
Enclosures



ENVIRODYNE
ENGINEERS

10151 Leck Road
St. Louis, Missouri 63141
(314) 464-6561

April 15, 1985
2086-68173

Mr. Jim Sparks
Ethyl Corporation
Edwin Cooper Plant
Monsanto Avenue
Sauget, Illinois 62201

Dear Jim:

Enclosed are two copies of the Sampling and Analysis Results for Ethyl Corporation for 2,3,7,8-TCDD prepared individually for the RIFS and future construction sites. These versions of the original report emphasize the results from only the areas indicated.

Results are the same as reported in the original report, and all quality control/assurance data apply, and can be found in Appendix B of the original report. Should you have any questions, please do not hesitate to call me.

Sincerely,

Dale T. Cira
Environmental Scientist

DTC/lav
Enclosures

SAMPLING AND ANALYSIS RESULTS
FOR
ETHYL CORPORATION FOR 2,3,7,8-TCDD
AT FUTURE CONSTRUCTION SITES
INCLUDING SITES A1-R1

Prepared for

Ethyl Petroleum Additives Corporation
Edwin Cooper Plant
Sauget, Illinois 62201

Prepared by

Envirodyne Engineers, Inc.
12161 Lackland Road
St. Louis, Missouri 63146

May, 1985
2086-68173

CHAPTER 1 EXECUTIVE SUMMARY

Envirodyne Engineers, Inc. (EEI) was contracted by Ethyl Corporation to continue the sample collection and analysis of specific soil sites at the Sauget, Illinois facility for 2,3,7,8-TCDD. Sample site locations were selected by Ethyl Corporation personnel prior to this collection episode. At most sites, two or more intervals were collected in a single boring, and separated for analysis. The samples were collected by split spoon with rotary drilling or with a hand auger, depending upon site conditions. John Mathes and Associates (JMA) was subcontracted by EEI to do the drilling where required. Samples were collected from February 22, to March 5, 1985.

Sixteen sites were sampled, during this phase of collection, resulting in 30 samples. The top interval of each of these sites was analyzed in the first round of analysis, and are discussed in this report. The results to date are shown in Table 2. Samples from the area slated for future construction by Ethyl Corporation turned out to have primarily negative results. Site M-1, however, had discrepancies in the analytical results from the first round and a rerun was requested. Results from the rerun proved negative.

The sampling procedures followed the guidelines set up by the EPA for sampling hazardous/toxic materials, and all protective measure were in place and adhered to. The analytical data is intended to satisfy EPA quality control criteria and is documented in Appendix B.

CHAPTER 2

INTRODUCTION

Envirodyne Engineers, Inc. (EEI) has been contracted by Ethyl Petroleum Additives Corporation (Ethyl) to further investigate the existence of 2,3,7,8-TCDD (dioxin) in the soil at various locations and depths throughout the Sauget, Illinois facility. The sample collection took place over seven days from February 22, to March 5, 1985. EEI subcontracted John Mathes and Associates (JMA) to provide drilling support for several locations where hand equipment would not be adequate to collect the sample.

Sample locations and depths had been outlined by Ethyl from previous work done at the facility by EEI. The intention of this survey was to verify and catalogue the levels of dioxin at these locations, since construction and previous excavation activities have been completed.

The data generated is intended to satisfy the EPA for quality control/assurance requirements. The documentation is included here as Appendix B, and summarized in Chapter 4.

CHAPTER 3

SAMPLING METHODS

Varied sampling methods were employed by EEI to obtain soil samples from the designated sites and intervals outlined by Ethyl's Sampling Plan. Sample depths ranged from 6 inches to 12 inches. Table 1 summarizes the sample collection phase of this survey, including site number and sampled depth intervals, number of composites per sample, the sample characteristics, collection method, and any pertinent comments regarding the sample. On site sample collection was over seen by Dale Cira of EEI.

During this part of the survey, a total of 19 sites were proposed. Prior to sampling, three sites were dropped from the plan for various reasons. These include Sites A-1, K-1, and L-1. At the conclusion of sampling, 16 sites were sampled. Locations of each site were marked on a blueprint map of the facility, which is currently in the possession of Ethyl Corporation. Of these sites, 12 were collected through the use of a rotary drill rig, and 4 collected using hand methods, including augers, shovels, or scoops. An explanation of each method follows.

DRILLING METHODOLOGY

Due to the compacted nature of the soils of the Ethyl Corporation site, and the depths involved in some areas, a drill rig operated by JMA was enlisted. The rig was operated by a two or three man crew consisting of Chuck Harris-operator, Mike Vogt-helper, and Chris Hebel-prep work; and supervised by Michael Kosydor. The rigs used for the drilling were a CME-55 truck mounted, and a CME ATV550 all terrain vehicle and set up with 3-1/4 inch hollow stem augers. Sample collection was made with either a 3 inch split spoon or 2 inch split spoon.

These sites required intervals from 0 to 6 inches and 6 to 12 inches. These samples were collected without the use of the augers, but still required the split spoon to be pushed hydraulically by the rig. At these sites, the spoon was advanced to six inches, retrieved, and a second spoon inserted into the hole left by the removed spoon, and pushed to 12 inches.

Occasionally, material from an upper interval would fall into the bore hole. This material is generally very loose and easily identified. When discovered, this fall-in material was discarded, so as not to be included in the sample for analysis.

HAND COLLECTION METHODOLOGIES

Several sites were selected to be collected by hand methods because of inaccessability of a drill rig to the site, or the material was soft enough to permit the use of a hand auger or other hand device. Hand collected sites were limited to depths of 18 inches. Equipment used consisted primarily of a 3 inch diameter stainless steel barrel type auger. All samples were taken with a clean auger. Cleaning procedures are explained in a later section. Fall-in material was appropriately discarded from these samples as in the split spoon samples.

TABLE 1
SAMPLE COLLECTION SUMMARY

Site	Date Sampled	Depth	Subsamples Per Composite	Segment Intervals	Sample Characteristics	Collection Method	Comments
A-1	(Dropped from plan)						
B-1	2/25	12"	1	0-12"	Wet gravelly sand.	Split spoon	Very little recovery so placed entire core in sample.
C-1	2/25	12"	4	0-6" 6-12"	Gravel and sand. Gravelly sand.	Split spoon	
D-1	2/27	12"	4	0-6" 6-12"	Sandy clay with gravel. Clayey fine sand.	Hand auger	Jack hammered 6" concrete.
E-1	2/25	12"	4	0-6" 6-12"	Gravelly sandy clay. Sandy clay with gravel.	Split spoon	
F-1	2/25	12"	4	0-6" 6-12"	Gravelly sandy clay. Gravelly sandy clay.	Split spoon	
G-1	2/25	12"	4	0-6" 6-12"	Compacted gravelly clay. Clay with gravel.	Split spoon	
H-1	2/22	12"	4	0-6" 6-12"	Sandy, gravelly clay. Sandy, gravelly clay.	3 Split spoon 1 Hand auger	Took one subsample with hand auger.
H-2	2/22	12"	4	0-6" 6-12"	Gravelly clay. Sand and gravelly clay.	Split spoon	
I-1	2/22	12"	4	0-6" 6-12"	Coarse gravel with clay. Sandy, gravelly clay.	Split spoon	
J-1	2/25	12"	4	0-6" 6-12"	Coarse, gravelly, sandy clay. Sandy clay.	Split spoon	
K-1	(Site dropped)						
L-1	(Site dropped)						
M-1	2/27	12"	4	0-6" 6-12"	Gravel and cinder fill. Gravel and cinder fill.	Split spoon	

TABLE 1

SAMPLE COLLECTION SUMMARY
(Continued)

Site	Date Sampled	Depth	Subsamples Per Composite	Segment Intervals	Sample Characteristics	Collection Method	Comments
N-1	2/27	12"	4	0-6" 6-12"	Gravel and cinder fill. Gravel and cinder fill.	Split spoon	
O-1	2/27	12"	2	0-6"	Soft fluffy, silty material.	Stainless steel scoop	Four composites from sides of piles.
P-1	2/22	12"	4	0-6" 6-12"	Clayey gravel and sandy fill. Sandy, clayey gravel.	Split spoon	
Q-1	2/28	12"	4	0-6" 6-12"	Sandy, gravelly clay. Sandy, stiff clay.	Hand auger	
R-1	3-5	12"	1	0-6" 6-12"	Wet, gravelly sandy, clay. Small gravelly sandy clay.	Hand auger	Added to list on 3/4/85. Removed 3" of gravel to top of interval.

One site required a different type of hand collection method. Site O-1 was of the stock-piled excavated materials and a 6 inch sample was required. Since this material was extremely soft, and samples were taken from the side slopes, a stainless steel spoon was used to obtain sample to the 6 inch depth.

SAMPLE HANDLING

Several sites required the compositing of subsamples from two to five borings to make up the final sample for analysis. These sites are identified in Table 1. To accomplish this, each interval, when obtained, was placed in a stainless steel mixing pan intended for that particular interval. As the additional, matching interval from each additional boring was collected, it was added to the mixing pan for that interval. Samples were thoroughly mixed to create as close to a homogeneous composite as possible. Stainless steel utensils were utilized for this purpose.

Each sample was physically described relative to its color, texture, particle size and other noticable characteristics. If subsamples varied from one another, it was so noted.

Samples were then transferred to amber glass 250 cc jars, properly identified with site and depth interval, and date and time of collection, sampler name, internal project name and number, and analytical parameter. These jars were capped with a teflon-lined, steel lid. All jars and lids were cleaned in the laboratory prior to their use in the field. Jars were placed in individual ziplock plastic bags for transportation and storage.

At the end of each sampling day, the samples collected were logged on the Chain of Custody papers and taken to the laboratory. Upon arrival at the laboratory, the samples were logged in and so noted on the Chain of Custody, placed in the walk-in cooler for storage and locked until required for analysis.

CLEANING PROCEDURES

To avoid the possibility of cross-contamination between sites and sample intervals, great care was taken to clean and rinse all equipment between intervals. After removal of the sample from the split spoon or auger bucket, the tool was thoroughly washed in a soapy Alconox solution to remove any soil. The tool was then rinsed several times with clean water. The final rinsing of each piece was done with hexane. All hexane used for rinsing was collected in a tin, marked container, for disposal at the laboratory.

All mixing equipment, including pans, spatulas and mixing spoons were cleaned after each interval was collected. Excess soil which was placed in the collection pans, but not needed to fill the sample jar was discarded either back into the borehole, or onto the pile of excavated material designated as site O-1.

Site clean-up also included the patching of holes in paved areas created by augering through asphalt or jack hammering through concreted areas. Table 1 indicates which sites required this procedure to gain access to the material

to be sampled. At the end of the sample collection phase, all holes in paved areas were patched with concrete and all rubble removed. Rubble was discarded to the excavated materials site.

PROTECTIVE MEASURES

EPA sampling protocol for dioxin contaminated material recommends the use of protective clothing, gloves, boots, eye protection, and respirator. In an effort to minimize the potentially vast quantities of hazardous materials for proper disposal, the standard disposable Tyvek suits were not used. In its place, each field participant wore a rubberized rain suit. This suit was then decontaminated at the end of each day by scrubbing down the suit with Alconox water and rinsing with clear water, until all soil material was removed. In addition to this suit, each field participant wore surgical gloves of PVC under heavy gage neoprene gloves, which were then taped to the rain suit with duct tape. Heavy rubber boots were used to protect the feet and rinsed clean in the same manner as the suits. Also worn were hard hats, safety glasses and nose-and mouth respirators equipped with both particulate and organic vapor filter canisters.

All discarded material, other than soil, determined to be potentially contaminated, was collected in a plastic bag, labelled, and disposed of through EEI's waste handling procedures. This material consisted of used respirator canisters, paper towels, some Tyvek, tape and PVC surgical gloves.

All cleaning and sample preparation activities were carried out away from the vehicle at a specified location for each site. A portable table was set up and protected by a double sheet of plastic taped to it. This acted as the prep and cleaning station. After each site was completed, the plastic was wiped clean and rinsed. At the end of each day, the plastic was removed and properly discarded.

The safety and collection procedures used at Ethyl Corporation were modified from the EPA protocol and EEI's in-house routines. These procedures are listed in the Appendix A as an EEI in-house memo dated April 11, 1985 and titled "TCDD Sample Collection," for reference.

CHAPTER 4 ANALYTICAL RESULTS

Results included in this report to date include all the top intervals from the 16 sites sampled. Table 2 lists the sites and intervals with EEI's internal lab number and the results of 2,3,7,8-TCDD concentrations in the samples analyzed. If a value, either zero or a positive number, is shown, the analysis is complete. A dash (-), indicates an interval for which the analysis is either not completed at this writing, or not necessary due to negative results of the upper interval. Values listed are in nanograms of dioxin per gram of soil (ng/g).

All of the results in the areas slated for future construction activity by Ethyl Corporation, indicated by an alpha-numeric site I.D.; i.e., A-1, turned out negative. Due to inconsistencies in the quality control data for sample M-1 O-6", a reanalysis of this sample was requested. Originally, the sample was reported to have a positive concentration of 0.31 ng/g. Upon the second analysis, the result was negative, with no problems with quality control.

The actual documentation of the analytical results are given in Appendix B. This material will show that for samples run, several quality assurance samples were also run. For this set of samples, two duplicates were run from the sample set, five method blanks, two EPA background samples (DC4814), and one EPA spiked sample (DC4815). This data is intended to satisfy EPA's requirements for data quality control. This document package consists primarily of the mass chromatograms of each sample run, but also includes a data summary as Form B-1, and other summary sheets pertinent to the quality assurance of each sample.

TABLE 2
ANALYTICAL RESULTS FOR FIRST ROUND

<u>Site</u>	<u>Interval</u>	<u>Lab No.</u>	<u>2,3,7,8-TCDD (ng/g)</u>
B-1	0-12	72092	0
C-1	0-6	72093	0
	6-12	72094	-
D-1	0-6	72265	0
	6-12	72266	-
E-1	0-6	72095	0
	6-12	72096	-
F-1	0-6	72097	0
	6-12	72098	-
G-1	0-6	72099	0
	6-12	72100	-
H-1	0-6	72006	0
	6-12	72007	-
H-2	0-6	72008	0
	6-12	72009	-
I-1	0-6	72010	0
	6-12	72011	-
J-1	0-6	72101	0
	6-12	72102	-
M-1	0-6	72267	0.31/0*
	6-12	72268	0
N-1	0-6	72269	0
	6-12	72270	-
O-1	0-6	72271	0
P-1	0-6	72012	0
	6-12	72013	-
Q-1	0-6	72293	Dropped from analysis
	6-12	72294	
R-1	0-6	72448	0
	6-12	72449	-

Note: *First result is not valid, actual value is 0 ppb.

CHAPTER 5

ANALYSIS PLAN

The analysis plan is designed to identify and catalogue the concentration levels of 2,3,7,8-TCDD (dioxin) in the soil at various locations throughout the Ethyl Corporation facility. Samples were collected at various depths to determine how deep the contamination may have extended. From previous sampling and analysis, an idea of expected concentrations at some sites was known, aiding the analysts in their interpretation, as well as in laying out the locations for sample sites during this collection episode.

The analytical chronology was designed to analyze the most suspected intervals first. In the case where more than one interval per site were collected, the top-most interval was analyzed first. If the results were positive, indicating some contamination, then the next interval would be analyzed. This procedure would continue until an interval from the sample site resulted in a zero value, or an uncontaminated interval. Table 3 lists the samples which, to date, have been selected to be analyzed based on the results being positive for the upper interval. Results are not ready at this writing for these intervals.

The method used for analysis of 2,3,7,8-TCDD in soil in our laboratory is the EPA developed methodology for contractor laboratories and is summarized in the following outline. All samples were run on the Hewlett-Packard 5996 GC/MS under column conditions described in the report found in Appendix B. All extraction and analysis procedures follow EPA protocol, as described earlier.

TABLE 3

SECOND ROUND ANALYSIS SAMPLES

<u>Site I.D.</u>	<u>Lab Number</u>	<u>Date Collected</u>	<u>Date Entered</u>
M-1 0-6"	72267	2/27	4/12
M-1 6-12"	72268	2/27	4/8

TCDD METHOD SUMMARY

Sample Prep

1. Weigh 10 grams \pm .05 grams into an Erlenmeyer.
2. Add 100 microliters of Sample Fortification Solution.
3. Add 20 grams of Sodium Sulfate and mix well.
4. Allow to sit for 2 hours; mix well' allow to sit 4 hours.
5. Mix well; add 20 ml Methanol; mix well; add 150 ml Hexane.
6. Shake at least 3 hours.
7. Filter and rinse with four 5 ml portions of Hexane.
8. Concentrate to 2-3 ml.

(Sample is ready for column clean-up)

DIOXIN METHOD SUMMARY

Column Clean-Up

1. Pack a 1 cm x 20 cm column with the following: (tap to settle between each addition).

- o 1 gram silica gel
- o 2 grams sodium hydroxide impregnated silica gel
- o 1 gram silica gel
- o 4 grams sulfuric acid impregnated silica gel
- o 2 grams silica gel

2. Pack a 1 cm x 30 cm column as follows: (tap as in No. 1)

- o 6 grams alumina
- o 1 cm purified sodium sulfate

3. Prewet each column with hexane assuring that there are no channels or air bubbles.

4. Transfer the extract from extraction step 14 to the top of the first column. Use four three milliliter aliquots to do this.

5. With 90 ml of hexane, elute the extract through column one directly into column two. Discard column one.

6. Add 20 ml hexane to column two and allow to drain until the hexane is just above the top of the column. Discard the eluted hexane.

7. Add 20 ml of 20% methylene chloride/80% hexane (volume/volume) to column two and collect the eluate.

8. With a gentle stream of dry nitrogen reduce the volume to about one to two ml.

9. Quantitatively transfer to a minivial. (use two 0.5 ml aliquotes of hexane for this).

10. Take to dryness with dry nitrogen. (use a water bath if necessary)

11. Store at 4°C until analysis.